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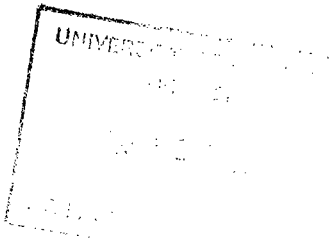

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INTRODUCTION

This analysis of the Minnesota Artificial Breeders Association (M.A.B.A.) was made at the request of the manager and the 12 directors of the central association. Because the association is organized on a federated basis, the study included an analysis of the central association and the 12 local members. The study was complicated by the lack of records from the various associations for any specific period. Consequently, it became necessary to study the operations from the time the local associations were organized up to the selected cutoff date of March 31, 1943. Comparisons were then made on a percentage and per cow basis (first breeding). The aim was to give as clear a picture as possible of the financial situation of the associations, and the operating results during their period of existence, and to point the way toward necessary adjustments in policies, which, if adopted, might result in a larger measure of business success.

FINANCIAL SITUATION

To analyze the financial situation of any business it is necessary to know what resources (assets) are at hand and who has a claim to such resources. In other words the owners and patrons of the business can well ask three questions: 1. What does the business own or control? (Namely, the assets.) 2. What does the business owe--to outside creditors? (Namely, the liabilities.) 3. What does the business owe to us--as owners and patrons? (Namely, the net worth.) The outside creditors' claims plus ownership claims (liabilities and net worth) are equal to the resources at hand (assets); therefore the accounting and analysis term, a Balance Sheet.

Local Associations. One of the 12 member associations supplies very little equipment --it is furnished by the inseminator. Another association did not have the necessary records. Therefore, the analysis of the balance sheets was limited to 10 member associations. An average of the financial situation was calculated on that basis. Although a number of these associations have been in operation for about the same number of months, there is a wide variation in financial circumstances, a result of the various degrees of efficiency in operation.

The average financial condition of the 10 associations is given in tables 1 and 2. According to table 1 the average amount of capital used by the 10 associations studied was approximately $1,136. This figure is low because of the affiliation with the central association. Of significance is the relatively low figure of approximately $181, or 15.9 per cent of the total, that represents fixed assets. Approximately 40 per cent of the total capital is an investment in the central association, whereby part of the capital is provided for it.

According to table 2 about 66 per cent of the capital, or resources at hand, is claimed by outside creditors, either in the form of current liabilities or notes payable. The remaining claim to about 34 per cent of the capital rests with the members. Membership fees paid in by the members of the local association averaged $744.50, which have been impaired during the period of operation to the extent of $359.68 so that the net worth averaged $384.82 as of March 31, 1943.

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[1]The author wishes to express his appreciation to Mr. R. Smith, manager of the central association, for his splendid cooperation and also to Dr. E. F. Koller, Division of Agricultural Economics, and the University Farm Committee on Artificial Breeding for their assistance in developing methods of analysis and in analyzing the technical phases of the association's business.

Table 1. Asset Values of 10 Member Associations of M.A.B.A., March 31, 1943

	Average of 10 Members		Your Association	
	Value	% of total value	Value	% of total value
Current Assets				
Cash	$307.47	27.1		
Accounts receivable	159.82	14.1		
Total current assets	$467.29	41.2		
Investment Assets				
Special assessment--M.A.B.A.	$437.50	38.5		
Other investments	15.20	1.3		
Total investments made	$452.70	39.8		
Fixed Assets				
Equipment	$201.85			
Res. for depr. - equipment	-21.30			
Net book value--fixed assets	$180.55	15.9		
Prepaid Expenses				
Supplies inventory	$ 2.00	.2		
Deposit on meter	1.00	.1		
Insurance	19.49	1.7		
Advance to M.A.B.A.	12.80	1.1		
Total prepaid expenses	$35.29	3.1		
Total Assets	$1,135.83	100.0		

Table 2. Liability and Net Worth Values of 10 Member Associations of M.A.B.A., March 31, 1943

	Average of 10 Members		Your Association	
	Value	% of total value	Value	% of total value
Current Liabilities				
Accounts payable	$272.68	24.0		
Accrued wages	81.15	7.1		
Accrued victory taxes	2.68	.2		
Breeding fees--advanced	37.04	3.3		
Total current liabilities	$393.56	34.6		
Notes Payable	357.45	31.5		
Total liabilities	$751.01	66.1		
Net Worth				
Membership fees	$744.50	65.6		
Net income or loss for period	-359.68	-31.7		
Total net worth	$384.82	33.9		
Total Liabilities and Net Worth	$1,135.83	100.0		

Central Association. The financial condition of the central M.A.B.A. is given in tables 3 and 4 for September 30, 1942, March 31, 1943, and June 30, 1943, so that changes can be observed. According to table 3 the capital requirement is far in excess of the average for each local association. This is largely because the bulls are owned centrally and corresponding equipment has to be supplied. With an increase in the bull inventory since the earlier date the total capital for the last two dates was over $19,000, of which about three fourths is in the form of fixed assets.

According to table 4 the liabilities of this association as of March 31, 1943, (the date comparable to the one used in analyzing the local associations) were 18.2 per cent in excess of the total assets. This includes the obligation of the central association to its local members for the funds advanced under a special assessment. If the obligation to the local associations is disregarded, the total liabilities are 92.2 per cent of the resources (assets). Considering all obligations, the net worth (ownership claim to the resources) is a minus quantity to the extent of $3,481. Some financial progress was made from March 31 to June 30, 1943, as indicated by the net worth figures.

OPERATING RESULTS

The source of income for the M.A.B.A. and its 12 members is the breeding fees paid by the dairy herd patrons. The income from this source must equal or exceed the expenses of operating both the local and central associations if the venture is to be a financial success. Herein, the association has had difficulty. Some adjustments have been made, and others will have to be made to attain this end. Two avenues of approach can be followed: to increase the fee to breeders, which was done on January 1, 1943, and to cut operating costs. The latter needs special attention. In this association there is the further problem of proportioning the breeding fees so that the local association and the central are assured the same relative financial success. Although the locals have not fared very well, they have in the past maintained their net worth at a more favorable position than the central association, indicating that the fees paid to the central were proportionately low.

Before January 1, 1943, the local associations collected $4.00 per cow at the time of "first breeding." If two or more breedings were required, there was no additional charge. Of the $4.00, $1.50 per cow was forwarded to the central association in payment for semen, leaving $2.50 with the local association to cover the other expenses. The breeding fees of the locals were raised to $5.00 per cow on January 1, 1943, and of that amount $2.00 per cow is now forwarded to the central association. The period covered in this analysis includes both the higher and lower fee per cow; therefore, average income figures are somewhere between the two rates that were in effect.

Local Associations. Incomes and expenses of all 12 of the local associations were included in the average and studied up to March 31, 1943. Several locals had been in operation for 18 months while a few others only for five months. The average income and expenses per month, the per cent each expense item is of total income, and the income and expenses per cow (first breeding) are given in table 5.

The average salary paid inseminators is around $150.00 per month. The figure of $153.08 is slightly higher than the actual amount paid because one inseminator received no additional income for mileage and several others received less than the common rate of 4 cents per mile. The inseminator's salary and mileage averaged $237.10 per month.

It is obvious that the local associations have three major items of expense, the inseminator's salary, his mileage, and the semen cost. These items amounted to 94.67 per cent of the total income.

Table 3. Asset Values of the Central M.A.B.A.

	September 30, 1942		March 31, 1943		June 30, 1943	
	Value	% of total assets	Value	% of total assets	Value	% of total assets
Current Assets						
Cash in bank	$2,156.07		$441.76		$808.15	
Accounts receivable--semen	730.50		2,831.30		3,113.80	
Accounts receivable--supplies	489.18		187.31		183.38	
Inventory--feed and straw	532.80		729.39		882.20	
Total current assets	$3,908.55	29.5	$4,189.76	21.9	$4,987.53	26.2
Fixed Assets						
Bull inventory	$7,861.58		$13,376.49		$12,192.94	
Barn equipment--net	529.49		513.49		497.71	
Machinery and general equipment--net	73.76		68.36		452.50	
Laboratory equipment--net	446.91		412.41		395.16	
Office equipment--net	41.94		38.46		36.72	
Truck	181.21		151.87		-----	
Total fixed assets	$9,134.89	69.1	$14,561.08	76.2	$13,575.03	71.2
Prepaid Expenses						
Bull lease	-----		$75.00		$37.50	
Bond and rent	$119.08		-----		33.32	
Insurance	50.61		281.45		412.51	
Deposit on power account	15.00		15.00		15.00	
Total prepaid expenses	$184.69	1.4	$371.45	1.9	$498.33	2.6
Total Assets	$13,228.13	100.0	$19,122.29	100.0	$19,060.89	100.0

Table 4. Liabilities and Net Worth Values of the Central M.A.B.A.

	September 30, 1942		March 31, 1943		June 30, 1943	
	Value	% of total assets	Value	% of total assets	Value	% of total assets
Current Liabilities						
Accounts payable	$302.72		$1,697.69		$241.10	
Advance fees for semen	269.50		105.50		100.00	
Accrued interest--F.S.A.	179.03		425.43		540.93	
Total current liabilities	$751.25	5.7	$2,228.62	11.7	$882.03	4.6
Long-term Liabilities						
Loan from F.S.A.	$15,400.00		$15,400.00		$15,400.00	
Funds advanced by locals	-----		4,975.00		5,300.00	
Total long-term liabilities	$15,400.00	116.4	$20,375.00	106.5	$20,700.00	108.6
Total Liabilities	$16,151.25	122.1	$22,603.62	118.2	$21,582.03	113.2
Net Worth						
Surplus	-----		$-2,923.12	-15.3	$-3,481.33	-18.3
Net operating gain*	$-2,923.12	-22.1	-558.21	-2.9	960.19	5.1
Total net worth	$-2,923.12	-22.1	$-3,481.33	-18.2	-2,521.14	-13.2
Total Liabilities and Net Worth	$13,228.13	100.0	$19,122.29	100.0	$19,060.89	100.0
*Analysis of the Net Operating Gain						
Operating gain	$-5,551.84		$-2,158.21		$210.19	
Contribution to mgrs. salary--F.S.A.	1,528.84		1,500.00		750.00	
Memberships--locals--nonrefundable	1,100.00		100.00		-----	
Net operating gain	$-2,923.12	-22.1	$-558.21	-2.9	$960.19	5.1

Table 5. Average Income and Expenses of the 12 Member Associations of M.A.B.A., from Beginning of the Associations to March 31, 1943

	Income and expenses per month	Per cent each item is of total income		Income and expenses per cow—first breeding	
	Average-all associations	Average-all associations	Your association	Average-all associations	Your association
Gross Income					
Insemination fees	$411.24	99.24		$4.222	
Other income	3.14	.76		.032	
Total income	$414.38	100.00		$4.254	
Operating Expenses					
Inseminator's salary	$153.08	36.95		$1.572	
Inseminator's mileage	84.02	20.28		.862	
Semen charge	155.16	37.44		1.593	
Operating supplies	9.38	2.26		.096	
Depreciation	1.38	.33		.014	
Insurance and bond	4.94	1.19		.051	
Rent	5.04	1.22		.052	
Bank charges	.12	.03		.001	
Telephone, light, heat, etc.	4.13	.99		.042	
Office supplies	4.67	1.13		.048	
Secretary's fees	1.90	.46		.020	
Directors' fees & expenses	8.75	2.11		.090	
Organization expense	1.88	.45		.019	
Miscellaneous	2.86	.69		.029	
Total operating expenses	$437.31	105.53		$4.489	
Operating income	-22.93	-5.53		-.235	
Nonoperating expenses—M.A.B.A. membership	6.30	1.52		.065	
Actual income	-29.23	-7.05		-.300	

On a per cow basis the total operating expenses amounted to $4.489 and exceeded the income, which averaged $4.254, by $0.235. In addition to the regular operating expenses, the local association paid a nonrefundable membership to the central association, and when this nonoperating expense is prorated on a per cow basis and added, the actual loss per cow totals $0.300. This is obviously a conservative statement of the actual loss because a number of the 15 to 18 months' records included two seasons with a larger number of breedings and only one with smaller numbers.

Wide variation existed in the operating efficiency and operating results of the 12 member associations. A comparison of the two most successful and two least successful associations with the average of all associations on a per cow basis is given in table 6.

The income from insemination fees and the semen expense vary only with the proportion of the lower fee period that is included in the figures for the different associations. Variations in two major items of expense indicate the need and opportunity for adjustments in some associations. On a per cow basis the inseminator's salary is 50 per cent and more higher in Association D than in Associations A and B. Although there is considerable difference in monthly salaries, the large variation in salary costs per cow is the result of wide variation in the number of cows serviced during a given period. The larger the number of cows over which a given salary can be spread, the lower will be the salary cost per cow. Still wider variations prevail in the inseminator's mileage cost. A high mileage cost may be the result of a low rate of conception, thereby involving additional trips to service the same cows, or it may be the result of distant and scattered herds. There is indication of the latter situation in most of the associations and also some indication of a low conception rate in several of the associations. Both of these problems will be considered later.

Central Association. For purposes of more detailed analysis the records of operations of the central M.A.B.A. prior to March 31, 1943, were divided into two periods, the first from October 15, 1941, to September 30, 1942, and the second from October 1, 1942, to March 31, 1943. To show further developments and progress, a later three months' statement was prepared for the period from April 1, 1943, to June 30, 1943. In comparing the operations during these three periods proper allowance must be made for "seasonality" in breeding dairy cows.

The total income and expenses for each of the three periods and the per cent that each item is of the total income for the period from October 1, 1942, to March 31, 1943, are given in table 7.

The association contributed to the manager's salary only during the first period to the extent of $1,651.28. The rest of the manager's salary up to July 1, 1943, was supplied by the Farm Security Administration, and amounted to approximately $3,800.00. These amounts contributed by F.S.A. to the manager's salary together with the loss from death and sales of bulls were added to the operating expenses to give the total for "adjusted operating expense." Any association "on its own" would have to meet these expenses. The central association also had some nonoperating income in the form of nonrefundable memberships, paid in by the local associations, which will not be available to the association in future periods. Major items of expense in the central association, as observed from table 7, are the manager's and helpers' salaries (12.73 per cent and 25.53 per cent of total income), feed (23.03 per cent), depreciation on bulls (12.33 per cent), operating supplies (8.26 per cent), mileage (7.54 per cent), and directors' fees (7.43 per cent). Some of the depreciation and other operating expense items have already been cut materially. Sires of low fertility have been replaced with younger and more virile animals. Considerable hay was put up in 1943 by the association from its own farm, which should cut feed costs for the rest of 1943 and 1944. The stock of operating supplies is now more abundant with less need for large purchases in the near future. Some of the items still need careful consideration with the thought of reducing operating costs.

Table 6. A Comparison of Operating Results of Four Different Local Associations with the Average of All--Period ending March 31, 1943

	Income and Expenses--Per Cow				
	Association A	Association B	Average-all associations	Association C	Association D
Gross Income					
Insemination fees	$4.475	$4.252	$4.222	$4.203	$4.150
Other income	-	.052	.032	.049	-
Total income	$4.475	$4.304	$4.254	$4.252	$4.150
Operating Expenses					
Inseminator's salary	$1.030	$1.118	$1.572	$2.208	$1.644
Inseminator's mileage	.466	.902	.862	.582*	1.177
Semen charge	1.738	1.576	1.593	1.585	1.571
Operating supplies	.094	.108	.096	.032	.181
Depreciation	.018	.024	.014	.023	.009
Insurance and bond	.019	.064	.051	.040	.015
Rent	.032	.---	.052	.034	.121
Bank charges	.001	.007	.001	.002	.001
Telephone, light, heat, etc.	.053	.066	.042	.102	.041
Office supplies	.030	.045	.048	.033	.080
Secretary's fees	.---	.050	.020	.---	.---
Directors' fees and expenses	.027	.107	.090	.082	.154
Organization expense	.---	.037	.019	.016	.048
Miscellaneous	.---	.005	.029	.006	.003
Total operating expenses	$3.508	$4.109	$4.489	$4.745	$5.045
Operating income	.967	.195	-.235	-.493	-.895
Nonoperating expenses --M.A.B.A. memberships	.053	.075	.065	.072	.078
Actual income--per cow	.914	.120	-.300	-.565	-.973

*Part of the mileage is covered in the higher salary.

Table 7. Total Income and Expenses of the Central M.A.B.A.*

	Oct. 15, 1941-Sept. 30, 1942	Oct. 1, 1942-Mar. 31, 1943		Apr. 1, 1943-June 30, 1943
	Total income & expenses	Total income & expenses	% each item is of total income	Total income & expenses
Gross Income				
Semen sales	$14,169.50	$11,778.50	99.93	$6,315.50
Other income	611.51	8.00	.07	721.00
Total income	$14,781.01	$11,786.50	100.00	$7,036.50
Operating Expenses				
Manager's salary	$1,651.28	-----	-----	-----
Helpers' salaries	3,221.76	$3,009.00	25.53	$1,615.20
Mileage	1,120.74	888.55	7.54	295.78
Gas and oil	94.24	116.23	.99	84.00
Operating supplies	921.49	973.64	8.26	180.84
Shipping expense	439.91	396.79	3.37	208.55
Feed	2,870.13	2,713.86	23.03	1,517.43
Veterinary fees	77.85	71.50	.61	20.00
Bull lease expense	430.00	75.00	.64	37.50
Depr.--bulls	1,279.63	1,453.52	12.33	883.14
Depr.--delivery truck	53.79	29.34	.25	-----
Depr.--barn equip.	86.39	31.30	.27	15.78
Depr.--laboratory equip.	67.21	34.50	.29	17.25
Depr.--mach. & equip.	2.24	5.40	.05	17.91
Repairs	120.36	139.00	1.18	-----
Remodeling	1,467.17	-----	-----	-----
Rent	730.63	562.50	4.77	281.25
Taxes	-----	58.75	.50	58.75
Interest--F.S.A.	179.03	246.40	2.09	115.50
Interest & float bank	117.63	68.55	.58	13.18
Insurance & bond	164.54	262.07	2.22	246.46
Telephone, power, and light	367.68	119.91	1.02	107.33
Office supplies	235.35	2.60	.02	-----
Depr.--furniture and fixtures	4.06	3.48	.03	1.74
Secretary's fees	63.00	27.00	.23	-----
Directors' and bull committee fees	1,833.60	875.69	7.43	329.47
Miscellaneous	226.12	16.08	.14	91.88
Total operating expense	$17,825.83	$12,180.66	103.34	$6,138.94
Manager's salary--paid by F.S.A.	$1,528.72	$1,500.00	12.73	$750.00
Loss, death, and sale of bulls	978.30	264.05	2.24	62.63**
Adjusted operating expense	20,332.85	13,944.71	118.31	6,826.31
Net gain for period	$-5,551.84	$-2,158.21	-18.31	$210.19
Nonoperating income--membership	1,100.00	100.00	.85	-----
Balance--net gain	-4,451.84	-2,058.21	-17.46	210.19
*Cows serviced	9,433	6,532		3,158

**Gain

The income and expenses of the central association on a per cow basis (number of cows for which a semen fee was obtained from local associations) are given in table 8.

The manager's and helpers' salaries together amounted to $0.679 per cow for the first period and $0.692 for the second period. A further cost of the management and help is part of the mileage which amounted to $0.119 per cow in the first period and $0.136 for the second period. Part of the mileage was used by the directors and by the bull committee, constituting an additional cost to that item (directors' and bull committee fees) which in the earlier period amounted to $0.194 and in the second period to $0.134 per cow. The cost of the seven major items, manager's salary, helpers' salaries, mileage, directors' and bull committee fees, feed, operating supplies, and depreciation on bulls totaled $1.531 per cow in the first period and $1.749 in the second period. These items alone practically required all of the income that became available. The last period (April 1, 1943, to June 30, 1943) covers a better than average breeding season. During this period the higher breeding fee of $5.00 per cow was in effect. Hay was put up from the M.A.B.A. farm. This, together with a curtailment in operating expenses, resulted in a net gain for these months.

The possibility of making adjustments, cutting costs, increasing the net gain, and finally improving the financial position of the M.A.B.A. and its 12 member associations was further investigated by comparing their operations with another somewhat similar association engaged in artificial breeding of dairy cows. This association, to be referred to as association X in the comparison, also has local units. All members belong directly to the central association, in contrast to the federated system followed by M.A.B.A. All breeding fees in association X are paid to the central office and all expenses of the local units are likewise paid directly by the central office. Only a combined operating statement is prepared. Therefore, to make a comparison of M.A.B.A. and its member associations with association X it was necessary to combine the average local association costs with the costs of the central M.A.B.A. The "per cow" figures were used for this purpose. For the central M.A.B.A. the record for October 1, 1942, to March 31, 1943, was used. Because the payment for semen by the locals was to their own organization, and the income to the central for semen was from its own members, these items were left out in combining the incomes and expenses of M.A.B.A. The record from April 1, 1942, to March 31, 1943, for association X was used in the comparison. The comparative figures of income and expenses are given in table 9. The costs per cow of the central and local associations are first given separately, to show where the major share of the costs for various items occurs, and are then given in total for comparison with association X. Six major items of costs are singled out that in M.A.B.A. greatly exceed the costs of the same items in association X. Together these margins of cost in M.A.B.A. over association X amount to $1.00 per cow, approximately the same as the difference in total operating expenses between the two associations. Therefore, for all other items the total difference is practically negligible, including the salaries to the managers and helpers. From the information at hand and in view of the adjustments under way, there is reason to believe that future adjustments in the direction of lowering costs can be more easily made in directors and bull committee fees and in mileage rather than in the other four items singled out.

BREEDING RESULTS AND PROBLEMS

Many of the problems encountered in artificial breeding by M.A.B.A. are common to other associations. To the extent that they are more fully understood and solved, the association and its local members should have greater financial success. Broadly, these problems are seasonality in breeding and variations in the conception rate. The variations in conception rate may be due to the condition of herds, condition and age of the semen, and variations in the techniques used by the inseminators.

Table 8. Income and Expenses Per Cow of the Central M.A.B.A.

	Oct. 15, 1941 to Sept. 30, 1942	Oct. 1, 1942 to March 31, 1943	April 1, 1943 to June 30, 1943
Gross Income			
Semen sales	$1.502	$1.803	$2.000
Other income	.065	.001	.228
Total income	$1.567	$1.804	$2.228
Operating Expenses			
Manager's salary	.175	.---	.---
Helpers' salaries	.342	.462	.511
Mileage	.119	.136	.093
Gas and oil	.010	.018	.027
Operating supplies	.098	.149	.057
Shipping expense	.047	.061	.066
Feed	.305	.415	.480
Veterinary fees	.008	.011	.006
Bull lease expense	.046	.011	.012
Depr.--bulls	.136	.223	.280
Depr.--delivery truck	.006	.004	.---
Depr.--barn equipment	.009	.005	.005
Depr.--laboratory equipment	.007	.005	.006
Depr.--machinery & equipment	.---	.001	.006
Repairs	.012	.021	.---
Remodeling	.156	.---	.---
Rent	.077	.086	.089
Taxes	.---	.009	.019
Interest--F.S.A.	.019	.038	.037
Interest and float--bank	.012	.010	.004
Insurance and bond	.017	.040	.078
Telephone, power, and light	.039	.018	.034
Office supplies	.025	.---	.---
Depr.--furniture & fixtures	.---	.001	.001
Secretary's fees	.007	.004	.---
Directors' and bull comm. fees	.194	.134	.104
Miscellaneous	.024	.002	.029
Total operating expense	$1.890	$1.864	$1.944
Manager's salary--paid by F.S.A.	.162	.230	.237
Loss, death, & sale of bulls	.104	.040	(gain).020
Adjusted operating expense	2.156	2.134	2.161
Net gain for period	-.589	-.330	.067
Nonoperating income--memberships	.117	.015	.---
Balance--net gain	-.472	-.315	.067

Table 9. A Comparison of Combined Incomes and Expenses per Cow (Central and Local) of M.A.B.A. with Association X-- Period ending March 31, 1943

	Central M.A.B.A.	Av. of local associations M.A.B.A.	Central & Local M.A.B.A.	Association X	Extent of higher costs in M.A.B.A. for major items
Gross Income					
Insemination fees	$.---	$4.222	$4.222	$5.000	
Other income	.001	.032	.032	.002	
Total income	$ .001	$4.254	$4.254	$5.002	
Operating Expenses					
Manager's salary	.230	1.572	1.802	.630	
Helpers' salaries	.462	.---	.462	1.748	$ .264
Mileage	.136	.862	.998	.298)	
Gas and oil	.018	.---	.018	.454)	
Operating supplies	.149	.096	.245	.114	.131
Shipping expense	.061	.---	.061	.039	
Feed	.415	.---	.415	.308	.107
Veterinary fees	.011	.---	.011	.010	
Bull lease expense	.011	.---	.011	.---	
Depr.--bulls	.263	.---	.263	.086	.177
Depr.--delivery truck	.004	.---	.004	.029	
Depr.--barn equipment	.005	.---	.005	.044	
Depr.--laboratory equip.	.005	.014	.019	.---	
Depr.--mach. & equip.	.001	.---	.001	.---	
Repairs	.021	.---	.021	.030	
Rent	.086	.052	.138	.---	.138
Taxes	.009	.---	.009	.010	
Interest and float	.048	.---	.048	.035	
Insurance and bond	.040	.051	.091	.062	
Telephone, power, light and heat	.018	.042	.060	.127	
Office supplies	.---	.048	.048	.024	
Secretary's fees	.004	.020	.024	.---	
Directors' and bull committee fees	.134	.090	.224	.040	.184
Organization expense	.---	.019	.019	.---	
Miscellaneous	.003	.030	.033	.020	
Total operating expenses	$2.134	$2.896	$5.030	$4.108	
Net gain or loss			$-.775	$ .894	

Seasonality in Breeding. The number of cows bred each month (first breeding) and the resulting monthly index for the period October 1, 1942, to May 31, 1943, is given in table 10. First breedings were used because they indicate in what months farmers wanted their cows bred. The indexes are based on the average number of first breedings per month for the eight-month period.

The total number of first breedings ranged from a low of 420 cows for the eight-month period (an average of 52 cows per month) in association No. 11 to the high of 1,284 for the eight-month period (an average of 160 cows per month) in association No. 10. Because association No. 10 had two inseminators, the two associations are not comparable. However, association No. 5 with 919 first breedings for the eight-month period (an average of 115 cows per month) had only one inseminator. The inseminator's salary per cow, as might be expected, was materially less in association No. 5 than in association No. 11.

The index of first breedings emphasizes the variation in the work load of the inseminators. Inseminators should realize at the outset that their job is highly seasonal and in view of certain light months they should be willing to give overtime during the peak breeding months. In the associations that have an extremely seasonal pattern, serious consideration might be given to a supplementary enterprise that would utilize part of the inseminator's time during the months of limited breedings. However, artificial insemination should remain the primary job.

According to table 10, first breedings in October in association No. 2 were only 26.0 per cent of average monthly first breedings, but in December were 203.4 per cent of average. By May they had dropped back to 53.5 per cent. In this association the breedings were heavy for fall freshening only. Quite a different case is presented in association No. 8. There, also, the first breedings in October were very light and only 26.0 per cent of average. By December they were 139.8 per cent of average and not nearly as high as in association No. 2. However, in May they were 139.1 per cent of average and practically as high as in December. The emphasis on late winter and spring freshening in association No. 8 is practically as great as on fall freshening which is quite different from association No. 2. A wide variation in the seasonality of first breedings will be observed from a comparison of a number of the other associations.

Conception Rates. Records were available from the 12 member associations from October 1, 1942, to May, 1943, of the total number of cows bred each month, and the number of the same cows that were bred again within 28 days (table 11). The total number of cows bred includes all services, namely, first, second, third, and other breedings. Of the number rebred, many are second breedings; others may be third breedings, etc. Not all the cows that failed to conceive are necessarily included in the number rebred. A cow might have passed over the first heat period unnoticed, or probably did not come into heat until six weeks or more after the last breeding or probably was sold as a nonbreeder. Also some cows might have been rebred even though they conceived at the first breeding. These and other irregularities enter in. Therefore, a record of the number of cows rebred and those correspondingly not rebred in 28 days should not be used as an accurate basis for determining the rate of conception. However, such a record can serve a very useful purpose in making an early check on breeding results. It is especially helpful to the manager of the central association in making an early comparison of results in the different local associations, so that special assistance can be given those encountering difficulties. Local inseminators should at all times keep complete and up-to-date breeding records.

According to table 11 the per cent of total cows rebred (average for all associations) was lower in the fall than in the winter and spring months but only slightly lower than in February. Because the number of cows bred in late fall and early winter is larger than in summer, it may be assumed that there is an accumulation of slow and nonbreeders for the late winter and early spring months, making up a

Table 10. First Breedings Each Month and the Resulting Index of Breeding*, 12 M.A.B.A. Associations, October 1, 1942 to May 31, 1943

Assns.		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Total 8 mos.
No. 1	No. of cows	41	71	113	104	96	108	103	101	737
	Index	44.5	77.1	122.7	112.9	104.2	117.2	111.8	109.6	
No. 2	No. of cows	21	33	164	148	76	87	73	43	645
	Index	26.0	40.9	203.4	183.7	94.3	107.9	90.5	53.5	
No. 3	No. of cows	21	39	114	99	93	63	85	74	588
	Index	28.6	53.1	155.1	134.7	126.5	85.7	115.6	100.7	
No. 4	No. of cows	25	46	92	107	33	60	90	103	556
	Index	36.0	66.2	132.3	154.0	47.5	86.3	129.5	148.2	
No. 5	No. of cows	----	56	255	190	147	96	112	63	919
	Index	26.9#	47.1	214.5	159.8	123.7	80.8	94.2	53.0	
No. 6	No. of cows	35	55	130	122	71	90	86	93	682
	Index	41.1	64.5	152.5	143.1	83.3	105.5	100.9	109.1	
No. 7	No. of cows	----	96	185	110	55	54	54	37	591
	Index	41.1#	123.3	237.6	141.3	70.6	69.3	69.3	47.5	
No. 8	No. of cows	37	52	199	159	171	147	176	198	1139
	Index	26.0	36.5	139.8	111.7	120.1	103.2	123.6	139.1	
No. 9	No. of cows	16	30	127	105	70	61	83	73	565
	Index	22.7	42.5	179.7	148.7	99.1	86.4	117.5	103.4	
No. 10	No. of cows	76	164	182	176	161	128	173	224	1284
	Index	47.4	102.2	113.4	109.7	100.3	79.7	107.8	139.5	
No. 11	No. of cows	9	22	90	89	56	39	50	65	420
	Index	17.1	41.9	171.5	169.5	106.7	74.3	95.2	123.8	
No. 12	No. of cows	39	49	163	141	141	110	122	95	860
	Index	36.3	45.6	151.6	131.2	131.2	102.3	113.4	88.4	
All Assns.	No. of cows	320	713	1814	1550	1170	1043	1207	1169	8986
	Index	33.7	63.1	160.4	137.1	103.4	92.2	106.8	103.3	

*Average monthly first breedings = 100.

#Estimate.

Table 11. Total Number of cows Bred each Month and the Number and Percentage Rebred within 28 Days, 12 Member Associations of M.A.B.A., October 1, 1942, to May, 1943

Assns.	Fall, 1942 Oct.-Nov.-Dec.			1943--January			February			March			April			May		
	Total Bred	No. Rebred	%	Total Bred	No. Rebred	%	Total Bred	No. Rebred	%	Total Bred	No. Rebred	%	Total Bred	No. Rebred	%	Total Bred	No. Rebred	%
No. 1	231	61	25.6	190	53	27.9	193	57	29.5	212	58	27.4	173	33	19.1	189	34	18.0
No. 2	307	77	25.1	233	76	32.6	167	53	31.7	189	64	33.9	165	62	37.6	133	44	33.1
No. 3	246	56	22.8	168	55	32.7	171	41	24.0	146	50	34.2	172	42	24.4	168	55	32.7
No. 4	356	79	22.2	182	47	25.8	148	43	29.1	158	53	33.5	223	87	39.0	226	76	33.6
No. 5	(no information)			349	96	27.5	348	97	27.9	266	95	35.7	265	81	30.6	220	48	21.8
No. 6	346	69	19.9	192	59	30.7	156	42	26.9	178	44	24.7	160	29	18.1	170	39	22.9
No. 7	362	124	34.3	203	58	28.6	136	28	20.6	115	25	21.7	119	30	25.2	99	19	19.2
No. 8a	253	71	28.1	148	47	31.8	144	32	22.2	190	62	32.6	226	65	28.8)			
8b	274	66	24.1	168	51	30.4	165	33	20.0	102	34	33.3	167	59	35.3)	449	168	37.4
No. 9	239	64	26.8	192	69	35.9	148	23	15.5	146	43	29.5	173	55	31.8	165	48	29.1
No. 10a	309	70	22.7	172	62	36.0	168	55	32.7	151	48	31.8	(no information)			(no information)		
No. 10b	314	66	21.0	145	59	40.7	130	44	33.8	159	69	43.4	194	72	37.1	230	100	43.5
No. 11	202	56	27.7	140	41	29.3	95	12	12.6	98	20	20.4	143	29	20.3	(no information)		
No. 12	411	105	25.4	211	54	25.6	270	76	28.1	280	107	38.2	324	113	34.9	255	59	23.1
All Assns.	3850	964	25.0	2693	827	30.7	2439	636	26.1	2390	772	32.3	2504	757	30.2	2304	690	29.9

larger proportion of total breedings for those months, and consequently an increasingly higher percentage of rebreeding within 28 days. Realizing this factor, inseminators in M.A.B.A. nevertheless feel that rebreedings are normally heavier in the winter and spring. This problem needs further consideration by feeding, livestock nutrition, and artificial breeding specialists.

A more accurate picture of conception rates can be obtained by considering a longer breeding period. Some discrepancies remain, but a comparison of total all breedings with total first breedings provides interesting information for a comparison of the different associations and inseminators. The figures for October 1, 1942, through May 31, 1943, were summarized for total all breedings and total first breedings. A ratio of all breedings to first breedings was calculated, and inversely also the percentage rate of conception. This was done for Guernseys, Holsteins, and all cows in each association, as given in table 12.

It can be observed from table 12 that the average conception rate for all cows in all associations was 52.7 per cent, indicating, as given in the ratio, that on the average practically two services per cow were necessary. Some slow or nonbreeders that were serviced four or five times naturally affected the average greatly. The conception rate for Holsteins was 55.3 per cent and for Guernseys 45.9 per cent. The conception rates by breeds, and by totals, are closely in line with results in another Minnesota artificial breeding association. They are also closely in line with results reported from a special study in Missouri[2].

Association No. 1 with 62.0 per cent had the highest rate of conception for all cows bred. This was 19.0 per cent higher than in association No. 4 which had only 43.0 per cent. In Holsteins, association No. 4 again had the lowest rate, 43.2 per cent, and No. 1 had the highest rate, 73.6 per cent. In Guernseys, association No. 9 had the lowest rate, 35.5 per cent, and No. 6 had the highest rate, 50.3 per cent. The wide variation in conception rates emphasizes the need for constant effort and the possibility of improving the situation in most of the associations studied. What is the reason for the differences? There are probably many--the general health and state of nutrition of the herd, the freeness from, or degree of infection of, Bang's and other diseases, the age and condition of the semen, the temperatures at which the semen is held, the care with which it is handled, and the techniques of inseminators. The reasons may vary from one association to another. In some cases there may be several. The herd owner and the inseminator together should give consideration to the possible causes and make adjustments carefully. To attain financial success and have continued good will in an association, a high conception rate must be maintained. Any trip for second or continued breedings is a "nonpay" trip.

LOCATION, SIZE, AND BREED OF HERDS

One of the 12 member associations of M.A.B.A., operating at a loss, averaged nearly 30 miles of travel per cow of first breeding. Others with financial difficulties have also had high mileage costs. This is in great contrast to one of the successful associations that has held its mileage to less than 15 miles per cow. There is a direct relationship between the number of miles driven per cow of first breeding and the financial success of the associations.

A poor conception rate will naturally increase the miles driven per cow of first breeding, because a second breeding will double it, a third breeding will triple it, and so forth. This alone emphasizes the financial reason for attempting to hold the conception rate as near maximum as possible.

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[2]Herman, H. A., and Swanson, Eric W., "Variations in Dairy Bull Semen with Respect to Its Use in Artificial Insemination." Mo. Agr. Expt. Sta. Res. Bul. 326, p. 21. 1941.

Table 12. Total All and Total First Breedings for Eight Months, Ratio, and Per Cent Conception, October 1, 1942 - May 31, 1943

Assns.	Guernseys				Holsteins				Total			
	Total Breedings		Ratio all to first breedings	% conception	Total Breedings		Ratio all to first breedings	% conception	Total Breedings		Ratio all to first breedings	% conception
	All	First			All	First			All	First		
No. 1	526	250	2.10	47.5	662	487	1.36	73.6	1188	737	1.61	62.0
No. 2	205	99	2.07	48.3	989	546	1.81	55.2	1194	645	1.85	54.0
No. 3	205	97	2.11	47.3	866	491	1.76	56.7	1071	588	1.82	54.9
No. 4	456	194	2.35	42.5	837	362	2.31	43.2	1293	556	2.33	43.0
No. 5	650	315	2.06	48.5	1195	604	1.98	50.5	1845	919	2.01	49.8
No. 6	439	221	1.99	50.3	763	461	1.66	60.4	1202	682	1.76	56.7
No. 7	168	84	2.00	50.0	866	507	1.71	58.5	1034	591	1.75	57.2
No. 8	616	276	2.23	44.8	1670	863	1.94	51.7	2286	1139	2.01	49.8
No. 9	200	71	2.82	35.5	863	494	1.75	57.2	1063	565	1.88	53.2
No. 10a	338	151	2.24	44.7	1623	946	1.72	58.3	2343	1284	1.82	54.8
10b	382	187	2.04	49.0								
No. 11	187	83	2.25	44.4	393	233	1.69	59.3	580	316	1.84	54.5
No. 12	311	121	2.57	38.9	1440	739	1.95	51.3	1751	860	2.04	49.1
All Assns.	4683	2149	2.18	45.9	12169	6733	1.81	55.3	16850	8882	1.90	52.7

Location. The location of the herds is highly important in holding down the inseminator's mileage per cow. Herds were summarized on the basis of those within a 0-5 mile radius, 6-10, 11-15, 16-20, 21-25, and more than 25 mile radius. This summary is given in table 13. Association No. 7 has 60 per cent of the herds within a 5 mile radius and another 37.4 per cent in the 6 to 10 mile radius. This is an excellent concentration of herds. Only two herds are more than 10 miles out. Association No. 12 has only 17.4 per cent of its herds in the 0-5 mile radius and 31.7 per cent in the 6-10 mile radius. Over one half of the herds are over 10 miles from the insemination center. The concentration pattern of the herds in these associations varies greatly, as indicated by the accumulated percentages of the herds within a certain radius (table 14). Association No. 9 has only 12.8 per cent of its herds within a 5 mile radius, quite a few less than either association No. 4 or No. 12. However, its concentration of herds within the 10 mile radius is greater. Association No. 8 has a fairly high concentration of herds within a 10 mile radius but the remaining herds are scattered widely, with some over 25 miles from the insemination center. In many areas now being served only a small percentage of the total herds are being bred artificially. There is ample opportunity to improve the herd location pattern and in turn reduce costs of operation.

Size of herds. The size of herds is of secondary importance compared to the concentration and location of herds, but has a bearing on the financial results of an association. If a herd is to be bred during a limited season of the year, any herd with over 21 cows would at some time or another have two cows serviced on the same day, thus a saving in mileage. Even in a herd with less than 21 cows the "chances" of two services in one day are greater in the larger herd. The number and percentage of herds in different size groups are given in table 15. According to these figures, 41.6 per cent of all herds fall in the 6 to 10 cow group. The 11 to 15 cow group has the next highest number constituting 24.4 per cent of the total. The accumulated percentages of herds in various size groups are given in table 16. It will be observed that 95.4 per cent of the herds have 20 or less cows. Association No. 4 has the largest percentage (41.5 per cent) of its cow herds in the "5 or less" cow class. Associations No. 4, 8, and 9 all have over 70 per cent of their cow herds in the "10 or less" group, compared to less than 50 per cent in associations Nos. 5, 6, and 7.

It is not expected that any discrimination will be made in artificial breeding between large and small herd owners. In fact, the small herd owner should be more interested than the large herd owner in breeding his herd artificially, because the costs per cow of keeping a bull would be higher than in the case of a larger herd. However, there are at the present time a large number of cases where only part of the herd is artificially serviced. To the extent that complete herds are artifically serviced instead of a few cows, mileage could be saved, the semen could be used more effectively, and the financial results of the associations should be better.

Breeds. A summary of the total number of cows serviced and the percentage that were Holsteins and Guernseys is given in table 17. Of the 10,624 cows reported for eight associations and one unit of a ninth association, 72.3 per cent were Holsteins and 27.7 per cent were Guernseys. In association No. 9, Guernseys constituted only 13.3 per cent of the total serviced. Associations Nos. 7, 8, 10, and 11 all had a relatively low number of Guernsey services. This problem needs careful study in these associations. Semen must be shipped by the central association to these locals regularly, but with only occasional Guernsey breedings much of it is not used.

From records available on 16 Holstein bulls used regularly during the period of January thru May, 1943, it was found that the average number of cows serviced per bull during this five-month period was 431 cows. If the average conception rate of 55.3 per cent is applied (table 12), there were approximately 238 cows bred per Holstein bull and an income obtained accordingly by the central association.

Table 13. Location of Herds from Insemination Center
June, 1943

Associations		Total Herds	0-5 miles	6-10 miles	11-15 miles	16-20 miles	21-25 miles	Over 25 miles
No. 1	Number	94	29	28	21	16	0	0
	Per cent	100.0	30.9	29.8	22.3	17.0	-	-
No. 2	Number	106	45	48	11	2	0	0
	Per cent	100.0	42.4	45.3	10.4	1.9	-	-
No. 3	Number	119	32	43	42	2	0	0
	Per cent	100.0	26.9	36.1	35.3	1.7	-	-
No. 4	Number	106	19	34	24	19	8	2
	Per cent	100.0	17.9	32.2	22.6	17.9	7.5	1.9
No. 5	Number	111	53	53	4	1	0	0
	Per cent	100.0	47.7	47.7	3.7	0.9	-	-
No. 6	Number	123	34	62	22	4	1	0
	Per cent	100.0	27.6	50.4	17.9	3.3	0.8	-
No. 7	Number	80	48	30	1	1	0	0
	Per cent	100.0	60.0	37.4	1.3	1.3	-	-
No. 8	Number	177	58	73	17	18	10	1
	Per cent	100.0	32.8	41.2	9.6	10.2	5.6	0.6
No. 9	Number	117	15	50	36	12	4	0
	Per cent	100.0	12.8	42.7	30.8	10.3	3.4	-
No. 10a	Number	91	24	49	8	6	4	0
	Per cent	100.0	26.4	53.8	8.8	6.6	4.4	-
No. 10b	Number	63	18	35	4	2	3	1
	Per cent	100.0	28.6	55.6	6.3	3.2	4.7	1.6
No. 11	Number	114	20	49	33	12	0	0
	Per cent	100.0	17.5	43.0	29.0	10.5	-	-
No. 12	Number	161	28	51	72	9	1	0
	Per cent	100.0	17.4	31.7	44.7	5.6	0.6	-
All Associations	Number	1462	423	605	295	104	31	4
	Per cent	100.0	28.9	41.4	20.2	7.1	2.1	0.3

Table 14. Percentage of the Total Number of Herds within a Given Radius

Associations	5 miles	10 miles	15 miles	20 miles	25 miles	All locations
No. 1	30.9	60.7	83.0	100.0	100.0	100.0
No. 2	42.4	87.7	98.1	100.0	100.0	100.0
No. 3	26.9	63.0	98.3	100.0	100.0	100.0
No. 4	17.9	50.1	72.7	90.6	98.1	100.0
No. 5	47.7	95.4	99.1	100.0	100.0	100.0
No. 6	27.6	78.0	95.9	99.2	100.0	100.0
No. 7	60.0	97.4	98.7	100.0	100.0	100.0
No. 8	32.8	74.0	83.6	93.8	99.4	100.0
No. 9	12.8	55.5	86.3	96.6	100.0	100.0
No. 10a	26.4	80.2	89.0	95.6	100.0	100.0
No. 10b	28.6	84.2	90.5	93.7	98.4	100.0
No. 11	17.5	60.5	89.5	100.0	100.0	100.0
No. 12	17.4	49.1	93.8	99.4	100.0	100.0
All Assns.	28.9	70.3	90.5	97.6	99.7	100.0

Table 15. Number of Herds in Various Size Groups - June, 1943

Assns.		1-5 cows	6-10 cows	11-15 cows	16-20 cows	21-25 cows	Over 25 cows	Total No. of Herds
No. 1	Number	18	30	32	9	5	0	94
	Per cent	19.1	31.9	34.1	9.6	5.3	-	100.0
No. 4	Number	44	36	16	7	3	0	106
	Per cent	41.5	34.0	15.1	6.6	2.8	-	100.0
No. 5	Number	8	46	34	14	7	2	111
	Per cent	7.2	41.5	30.6	12.6	6.3	1.8	100.0
No. 6	Number	23	30	35	20	7	8	123
	Per cent	18.7	24.4	28.4	16.3	5.7	6.5	100.0
No. 7	Number	5	32	28	13	2	0	80
	Per cent	6.3	40.0	35.0	16.2	2.5	-	100.0
No. 8	Number	34	93	28	17	1	4	177
	Per cent	19.2	52.5	15.8	9.6	0.6	2.3	100.0
No. 9	Number	31	56	18	8	3	1	117
	Per cent	26.5	47.9	15.4	6.8	2.6	0.8	100.0
No. 10a	Number	11	43	27	7	3	0	91
	Per cent	12.1	47.2	29.7	7.7	3.3	-	100.0
No. 11	Number	21	56	29	8	0	0	114
	Per cent	18.4	49.1	25.5	7.0	-	-	100.0
All Assns.	Number	195	422	247	103	31	15	1013
	Per cent	19.2	41.6	24.4	10.2	3.1	1.5	100.0

Table 16. Accumulated Percentages of Herds in Various Size Groups

Associations	5 or less	10 or less	15 or less	20 or less	25 or less	30 or less	All herds
No. 1	19.1	51.0	85.1	94.7	100.0	100.0	100.0
No. 4	41.5	75.5	90.6	97.2	100.0	100.0	100.0
No. 5	7.2	48.7	79.3	91.9	98.2	99.6	100.0
No. 6	18.7	43.1	71.5	87.8	93.5	99.2	100.0
No. 7	6.3	46.3	81.3	97.5	100.0	100.0	100.0
No. 8	19.2	71.7	87.5	97.1	97.7	98.3	100.0
No. 9	26.5	74.4	89.8	96.6	99.2	99.2	100.0
No. 10a	12.1	59.3	89.0	96.7	100.0	100.0	100.0
No. 11	18.4	67.5	93.0	100.0	100.0	100.0	100.0
All Associations	19.2	60.8	85.2	95.4	98.5	99.4	100.0

Table 17. Total Number of Cows and the Percentage of Holsteins and Guernseys

Associations	Total No. of herds	Split or mixed herds	Both Breeds	Holsteins		Guernseys		Av. size-all herds
			Total No. of cows	No.	% of total	No.	% of total	
No. 1	94	12	1109	739	66.6	370	33.4	11.8
No. 4	106	18	828	544	65.7	284	34.3	7.8
No. 5	111	15	1364	812	59.5	552	40.5	12.3
No. 6	123	25	1588	979	61.6	609	38.4	12.9
No. 7	80	1	984	818	83.1	166	16.9	12.3
No. 8	177	6	1690	1321	78.2	369	21.8	9.5
No. 9	117	9	1024	888	86.7	136	13.3	8.8
No. 10	91	2	967	732	75.7	235	24.3	10.5
No. 11	114	0	1070	847	79.2	223	20.8	9.4
All Associations	1013	88	10624	7680	72.3	2944	27.7	10.5

From similar records for eight Guernsey bulls used regularly for the same period, it was found that the average number of cows serviced per bull for this period was only 315. If the conception rate of 45.9 per cent is applied (table 12), there were approximately only 145 cows bred per Guernsey bull, 93 cows per bull less than for Holsteins, resulting in a smaller income to that extent.

Unless an increase in Guernsey numbers can be obtained, some associations may have to discontinue Guernsey services completely. The Guernsey situation especially emphasizes the need for including more herds where they are available. It further emphasizes the earlier suggestion that where Guernsey herds are now only partly included in the artificial insemination program, inclusion of the remainder of the cows in such herds, in some associations, would increase the number of Guernsey breedings sufficiently for continued operation.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The capital requirement of local artificial breeding associations is very low if they are affiliated with a central association. The average capital requirement of the 12 local associations of M.A.B.A. was $1,135. Of this amount, only $180 represented fixed assets.

When a number of local associations are being served, the capital requirement in a central artificial breeding association is considerable. In the central M.A.B.A. total capital requirements were over $19,000 of which from $13,000 to $15,000 was in fixed assets. The bull inventory of from $12,000 to $13,000 is the major item.

A large share of the capital in the central M.A.B.A. is being furnished by outside creditors. It would be desirable to have more of the capital furnished by the members and patrons. This should be done by making a capital assessment on a per cow basis by the local associations which would be passed on to the central association.

The breeding fee of $4 per cow, in effect prior to January 1, 1943, was too low. The present fee of $5 per cow should be sufficient in most associations. A few associations in areas with small and scattered herds should consider a still higher fee.

The three major items of cost in a local association are the inseminator's salary, the inseminator's mileage, and the outlay for semen. Whether or not an existing local association or a new one can be justified is determined by the number and location of cows available for artificial breeding. In most of the local associations of M.A.B.A. the cost per cow of the inseminator's salary and his mileage has been too high for successful operation. More cows serviced in a more concentrated area will alleviate this problem.

The major items of cost in the central M.A.B.A. were the manager's and helpers' salaries, feed for the bulls, depreciation on bulls, operating supplies, and directors' and bull committee fees. Careful management should make it possible to reduce these costs considerably. This is indicated from a comparison with another association.

Alert and active directorship is of utmost importance in any cooperative association. Directors are entitled to compensation for their services. However, directorship costs must not be excessive. In both the central and local associations, but especially in the central association, directorship costs have been extremely high. This is partly the result of the large area included in the M.A.B.A. and the resulting large mileage when directors' meetings are held. This expense can be eliminated in large part by holding only a limited number of meetings of the entire board of directors each year, and selecting a smaller executive committee to perform the necessary functions in the interim. The officers of the association might constitute part of the executive committee. Consideration should be given to the selection of an executive committee that would be representative of the various areas included in M.A.B.A.

Artificial breeding of dairy cows is a very seasonal enterprise. Late summer and early fall months have only a limited number of breedings compared to late fall, winter, and spring. The seasonal pattern varies greatly between associations. Some associations have demand for breeding so that cows freshen mostly in fall, while others have considerable emphasis on spring freshening, while still others have only a slight variation in breedings from month to month. The seasonal pattern of breedings greatly affects the labor load of the inseminator. In associations with an extremely seasonal pattern of breedings, supplementary enterprises might be considered for the inseminator in the slack season with the further possibility of providing an assistant during the peak breeding months.

A record of the number of rebreedings within a 28-day period gives an advance indication of the results of artificial breeding. It should not be used as a good measure of conception rates.

Unless each cow's breeding record is followed thru for a period of months, an accurate picture of conception rates is hard to get. The ratio of all breedings to first breedings and the corresponding conception rate, as calculated for the M.A.B.A. associations, should give a fairly accurate picture of results, especially as a means of making a comparison between local associations. It would be desirable to make this calculation on the basis of a full year's record. Slow or nonbreeders increase the ratio or lower the conception rate considerably.

The conception rate for Guernseys was lower than for Holsteins in each of the 12 associations of M.A.B.A. This is in line with results in other Minnesota artificial breeding associations, and associations in other states.

In several associations the number of cows for which Guernsey semen is used is very limited. In these associations the number of Guernsey breedings should be increased or the service discontinued entirely.

Mileage costs are high in most of the associations because the herds are widely scattered. A concentration of herds in one area and nearer to the insemination center will help to solve this problem.

There is greater possibility of servicing two animals at one time in a large than in a small herd, thus lowering the mileage cost per cow. In some herds only a few of the cows are bred artificially. If the whole herd was serviced, the costs per cow should be lower.

Neither the central nor the local associations has kept sufficient records to properly guide them in their business operations. Recently, considerable adjustments have been made toward adopting better records in the central association. Complete financial and breeding records are absolutely essential for business success. In the M.A.B.A. it appears that the most uniform and best set of records would be obtained by having the major bookkeeping of the 12 local associations done by the central association. Forms for making monthly reports should be provided each local association and should be filled out by the inseminator. Representatives of the board of directors should approve all financial transactions. The fees now obtained by local secretaries could be turned over to the central association to be applied to the salary of a regular bookkeeper.

The business problems of the central and local associations of M.A.B.A. are closely interrelated. One depends upon the other for its complete success. This adds further reason for complete records in the local association that can periodically be furnished to the central association. The local associations would benefit by periodically receiving a statement of operations from the central association and a report of comparisons of local associations. In this way the business and technical problems could be given attention as they arise. The business of the central association should be so organized that the manager has sufficient time to keep in close contact with the local inseminators and to assist them in every way possible with their problems.